July 7, 1994
GFK-0838C

IMPORTANT PRODUCT INFORMATION

READ THIS INFORMATION FIRST

Product: **Programmable Controller CPU Module**
IC697CPU780D

This is the production release of the IC697 PLC Model 780 CPU module, version 4.60. The purpose of this release is to provide the new Redundancy enhancements described under "New Features and Functionality".

Table 1. Catalog Number

New Catalog Number	Replaces
IC697CPU780D	IC697CPU780C or earlier

Identification

Hardware and software identification is summarized in the following tables.

Table 2. Hardware Identification

Catalog Number	Board Identification	Board Revision
IC697CPU780D	CPHA2	44A731786-G01 R07 or later

Table 3. Software Identification

Catalog Number	EPROM Location	EPROM Label
IC697CPU780D	U72	397-027C 4.60
	U73	397-028C 4.60
	U74	397-030C 4.60
	U75	397-029C 4.60

Update Information

Update kits are available for a charge to update the CPU 780 to version 4.60.

Table 4. Upgrade Kit

Upgrade Kit	For Upgrading
44A731247–G02	IC697CPU780C to IC697CPU780D

Documentation

The following table lists applicable documentation for the IC697CPU780D CPU.

Table 5. User Documentation

Catalog Number	Data Sheet	User Manual
IC697CPU780D	GFK-0837	GFK-0827

Read this document before installing or attempting to use the Model 780 PLC CPU Module. For more information, refer to the applicable *Programmable Controller Installation Manual, Programming Software User's Manual, Programmable Controller Reference Manual,* and the *Hot Standby CPU Redundancy User's Guide.*

Special Operation Notes

Caution

This release of the PLC CPU Redundancy Feature requires one of the following IC697 32-Bit Expansion Memory modules:

IC697MEM731D or later
IC697MEM732C or later
IC697MEM733D or later
IC697MEM735D or later

IC641 Compatibility

1. This release of the PLC CPU modules is compatible with the version of IC641 programming software listed in the table below.

CPU Model	IC641 Programming Software
CPU780	Version 4.50 or later

PCM and BTM Compatibility

2. With the introduction of timing improvements and new features with the PLC CPU model 780, it is highly recommended that systems using PCMs use IC697PCM711J, or later, and systems using BTMs use IC697BEM713B, or later. Earlier revisions of these modules are susceptible to producing bus errors on the backplane.

Notice to Upgrade GBC/NBC Hardware

3. With the introduction of the PLC CPU 780, timings with the IC66* Bus Controllers (GBCs / NBCs) have changed; this has uncovered a problem in the GBC / NBC firmware. GBCs / NBCs in expanded racks could be lost if the system is fully configured and only the main rack cycles power.

   It is recommended to update existing GBC/NBC hardware with Bus Controller IC697BEM731K or later.

Reference Tables

4. Reference tables will not be changed during any STORE operation unless you specifically select storing of reference tables.

Foreign VME Modules

5. IC641 programming software allows foreign VME modules to be configured for four modes: BUS INTERFACE, INTERRUPT ONLY, FULL MAIL, and REDUCED MAIL. However, the PLC CPU 780 Release 4.56 supports only the BUS INTERFACE MODULE mode. *The other three modes should not be configured.*

Serial Communications

6. The following operational restrictions exist for the Serial Communications feature:
    1. Serial communications may add up to 5 ms of time to any given sweep. This should be taken into account when setting the watchdog timer.
    2. The following procedure is recommended when changing baud rates in the PLC and the WSI board. First enter the configuration package and change the baud rate on the PLC, then store the new configuration. Now power off the PLC and then go to the WSI setup screen and change the WSI baud rate. Finally, power the PLC back on.
    3. The link idle time setting in IC641 programming software Config for Serial Communications should not be set to less than 10 seconds - otherwise a communications failure will occur when storing the config to the PLC.

IC641/WSI Attach

7. Do not connect or disconnect the WSI/BTM cable while the programmer host is powered-on. This action may cause a running PLC to switch roles from active to standby if running synchronized or go to STOP if running non-synchronized..

Expansion Rack ID

8. The expansion racks for the IC641 PLC are shipped with the rack ID strapped for rack 0 (the main rack). If the rack jumper is not changed the PLC will not recognize the rack at all and may not properly identify the error.

Expansion Rack Cable

9. Do not connect or disconnect the expansion rack cable while the CPU is running. This will cause the PLC to go to the STOP/HALT mode.

Expansion Rack Power

10. Expansion racks should be powered up at the same time that the main rack is powered up, or they should be powered up after the main rack has completed its power-up initialization. *Do not power-up an expansion rack while the CPU is running power-up diagnostics.*

Memory Usage

11. A general rule-of-thumb for memory usage is 48 bytes per I/O point plus register memory in bytes.

Timer Operation

12. Care should be taken when timers (ONDTR, TMR, and OFDTR) are used in sub-blocks that are NOT called every sweep. The timers accumulate time across calls to the sub-block unless they are reset. This means that they function like timers operating in a program with a much slower sweep than the timers in the main program block. For program blocks that are inactive for large periods of time, the timers should be programmed in such a manner as to account for this catch up feature.

    Similar to this are timers that are skipped because of the use of the JUMP instruction. Timers that are skipped will NOT catch up and will therefore not accumulate time accurately.

I/O Link Interface

13. When powering up the PLC CPU without a battery and I/O Link Interface boards are present, an incorrect "Loss of Module" fault will be logged for each I/O Link Interface board; but the PLC CPU will not consider these boards as lost, and the boards will continue to operate properly.

Constant Sweep

14. Constant Sweep time, when used, should be set to about 10 ms greater than the normal sweep time to avoid any oversweep conditions when monitoring or performing on-line changes with the programmer. The smallest valid constant sweep time setting is 10 milliseconds for the Model 780. Window completion faults will occur if the constant sweep setting is not high enough.

Interaction of IC641 Programming Software with Closed Programming Window

15. The IC641 programming software Sweep Control and Monitor screen cannot be used to change the PLC's Sweep Modes or timers (Constant Sweep Time, Program Window Times, etc.) while the program window is closed. Use Service Requests #1 through #4 to perform these functions.

Loss of Option Module

16. With Hot Standby CPU Redundancy, it is recommended to leave the fault action of loss of option modules at DIAGNOSTIC. If changed to FATAL, it is possible that a faulted Redundant Communication Module would cause both systems to go to STOP/FAULTED mode at power-up.

Simplex Mode

17. Simplex mode, the mode in CPU Redundancy where the PLC CPU 780 can operate in a single PLC CPU system, is not supported. The PLC CPU 780 can operate as a non-synchronized CPU with a Redundant Communications Module configured with IC641 software.

Caution

IC641 programming software cannot be used to change the PLC mode (STOP, RUN, etc.) while the programming window is closed. To change the PLC mode, use the toggle switch on the CPU module.

Problems Resolved by this Upgrade

Not applicable.

New Features and Functionality

Increased Transfer Size

1. The transfer buffer size has been increased from 16K bytes to 48K bytes, where 20K bytes of data may be transferred during the input transfer, and up to 28K bytes of data may be transferred during the output transfer. This feature requires version 5.0 or later of IC641 Programming Software.

Transfer from Backup

2. The transfer of 8 bytes (4 registers) of data from the Backup Unit to the Active Unit through use of new SVC_REQ service requests (SVC_REQ 27 and SVC_REQ 28) is now supported.

Faster Failure Detection

3. GBC/NBCs now detect failure of the PLC CPU sooner. This will allow the standby to take full control more quickly. The new detection time is based on the configured CPU watchdog timeout value. Use of this new functionality requires GBC/NBC hardware with GBC/NBC IC697BEM731/734K.

RUN/DISABLE

4. The system now enforces that the Active Unit's outputs will be driven if either of the units is in RUN/ENABLE. This is implemented by rejecting role switches from RUN/ENABLE units to RUN/DISABLE units and by performing automatic role switches when necessary.

Restrictions and Open Problems

1. If an expansion rack powers up while the CPU in the main rack is in the RUN mode, the slot fault contacts will prematurely indicate that the modules in the expansion rack are not faulted *before* they complete their power up.
2. In a multi-rack system, false LOSS OF RACK faults may occur when the system loses power. If this fault is configured to be fatal, the system will power-up in STOP mode.
3. Since there are no tasks that run in the PLC's background window, changes made to the Background Window Timer with IC641 programming software will have no effect.
4. When there is no logic stored in a CPU module the %Q and %M tables will be cleared when the CPU is placed in RUN mode. In this context "no logic stored" means that no program had ever been stored or that the clear function in IC641 programming software had been used to clear logic and configuration.
5. If the CPU's toggle switch is moved to STOP and back to RUN while a C block is sending text out the serial port, the serial port will stop working. The CPU will have to be power cycled to make SNP and C block messages work again.
6. When the Bit Sequencer sequences from one step to another, the negative transitional contact that corresponds to the original step is not set. The transition contact for the new step is set and remains set until the sequencer sequences to the next step.

7. If multiple faults exist in an IC697 PLC remote drop and one of them is corrected, a FAULT contact that uses the remote drop's module reference will incorrectly indicate that no fault exists at the remote drop.
8. When power is cycled on an expansion rack in a system that is running a large sweep time when IC641 programming software is not connected, IC66* Bus Controllers in that rack may not be properly configured. This can be corrected by cycling power on the main and expansion racks.
9. User application faults logged for Service Request #21 can only use error codes between 0 and 2047. Use of any other error codes could cause the PLC to treat the alarms as Remote Scanner alarms.